

ABSTRAK

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PENGUJIAN *BLACKSTART* PLTG MPP PARIT BARU 150 KV BLOK 2 UNIT 4 DAN *LINE CHARGING* BAY LINE 150 KV PARIT BARU - SENGGIRING 2 DALAM MEMPERCEPAT PEMULIHAN SISTEM KHATULISTIWA

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Penelitian ini bertujuan menganalisis kemampuan unit PLTG MPP Parit Baru Blok 2 Unit 4 dalam melaksanakan blackstart, respon sistem terhadap pembebanan bertahap, pengaruh line charging terhadap stabilitas tegangan dan daya reaktif, serta kesesuaian hasil simulasi DIgSILENT dengan kondisi aktual pada Sistem Khatulistiwa. Metode yang digunakan adalah analisis deskriptif kuantitatif berdasarkan data pengujian blackstart dan line charging tanggal 3 Februari 2026 dengan parameter tegangan, frekuensi, daya aktif, dan daya reaktif. Hasil penelitian menunjukkan bahwa unit mampu melakukan start mandiri dan membentuk sistem island secara stabil dengan tegangan berada pada rentang 148,28 kV hingga 151,68 kV dan frekuensi 49,80 Hz hingga 50,10 Hz. Proses pembebanan bertahap hingga 9,5 MW berlangsung stabil tanpa osilasi signifikan. Line charging menyebabkan perubahan daya reaktif sekitar 3 MVAR namun tidak menimbulkan instabilitas tegangan. Perbandingan hasil simulasi dan data aktual menunjukkan kesesuaian karakteristik respon sistem, sehingga model simulasi dapat digunakan sebagai acuan evaluasi dan strategi percepatan pemulihan sistem tenaga listrik.

Kata Kunci: Blackstart, Line Charging, Stabilitas Tegangan, Stabilitas Frekuensi, Simulasi DIgSILENT

ABSTRACT

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*BLACKSTART TESTING OF THE NEW PARIT MPP PLTG 150 KV BLOCK 2 UNIT 4 AND THE NEW PARIT - SENGGIRING 2 CHARGING BAY LINE 150 KV IN ACCELERATION OF THE EQUATORIAL SYSTEM RECOVERY PT PLN Persero UP2B West Kalimantan System
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This study aims to analyze the capability of PLTG MPP Parit Baru Block 2 Unit 4 in performing a blackstart operation, the system response to gradual load restoration, the impact of line charging on voltage and reactive power stability, and the consistency between DIGSILENT simulation results and actual operating data in the Khatulistiwa Power System. The research method used is a quantitative descriptive analysis based on the blackstart and line charging test conducted on February 3, 2026, using voltage, frequency, active power, and reactive power parameters. The results show that the unit successfully performed a self-start and formed a stable islanded system, with voltage ranging from 148.28 kV to 151.68 kV and frequency from 49.80 Hz to 50.10 Hz. Gradual load restoration up to 9.5 MW was carried out smoothly without significant oscillation. Line charging caused a reactive power change of approximately 3 MVAR but did not affect voltage stability. The comparison between simulation and actual data indicates similar system response characteristics, confirming that the simulation model can be used as a reference for evaluation and acceleration of system restoration strategies.

Keywords: Blackstart, Line Charging, Voltage Stability, Frequency Stability, DIGSILENT Simulation.